

## Report on the visit to Vienna on September 20, 21, and 22, 1973

We were met at the Vienna airport by Dr. W. Fasching and deposited at the Savoy Hotel.

The morning of September 21 was spent at the Allgemeines Krankenhaus (where my father had a portion of his surgical training in 1907) an entirely new hospital is in the process of construction. It will have 3000 beds with 36 modern operating rooms. There are 45 surgeons on the staff. There appeared to be rather adequate laboratory spaces, but the pattern in which support is provided was not made clear. Those persons met were as follows. Prof. Dr. Johann Navratil, who was an unexpected winner in the appointment to the professorship two or three years ago. He had apparently been working in Prague prior to that time and continues to have activities there as well as in Vienna. A second person was an associate professor named Helmer (who later presented two papers at the meeting in Barcelona). The man in charge of the program having to do with circulatory assistance in the artificial heart is a Dozent E. Wolner, who is in charge of the program on the artificial heart and on circulatory assistance. In addition, there were Dr. F. Unger and Dr. S. Stellwag, surgeons. Dr. Walter Fasching was my original contact with Prof. Navratil. A doctor of veterinary medicine name Lofert and Dr. H. Thoma, an engineer, complete the team.

Two-thirds of a day of review of the establishment and various projects, with no experiments in progress, left the following impressions. Pride was expressed in a mock loop utilized for testing bladders for pumps of the Bernhard design made of silicone rubber. They are still working on the control mechanism utilizing the pressure wave as reported by Bernhard. The mock loop fails to take into consideration the matter of proper compliance, which was so nicely handled in the Berlin laboratories.

There were studies on control of hemolysis which used as a control an open beaker stirred with a rotating electro-magnetic field, the experimental circuit having no open air blood interface. The control appeared therefore not to be very appropriate.

The group has made a fully computerized console for intraaortic balloon pumping called the Konterpuls IV. This is a magnificently complex electronic circuit capable of providing automatic adjustment of degree of inflation, time, lag, duration of pulsation, and pressure. It was stated that the operator need only utilize the on and off switches.

A much less elegant device for counterpulsation was in use in the operating room suite. The entire circuitry and gas supply are housed in a base plate which extends not more than eight inches above the floor (see photograph).

The intensive care unit uses telemetry for routine electrocardiographic purposes. Each unit is approximately two by three by one centimeter and each unit contains an electrode, an electrocardiographic amplifier, and telemetry circuitry. In practice two units are taped to the chest wall. There are therefore no interfering wires to hamper patient care or interfere with the use of circulatory assist devices.

The group is interested in provision of emergency care in the event of myocardial infarction with shock and has developed an intraaortic balloon console which is totally selfcontained and which fits into a suitcase. It can be plugged into regular house electric current or it can run for two hours on contained batteries. It includes a recorder and helium tank. It is intended for placement in outlying hospitals and transport by ambulance with support in force.

There is apparently close collaboration with the Department of Hematology immediately adjacent, but there is but the most elementary comprehension of the problems of biomaterials. There is one polymer "technician", named Mueller in the group. The visitor was informed that the group simply uses "well-known techniques" and accepts what the commercial companies are willing to provide for them. They are nevertheless attempting to provide flocking after Bernhard and to cover their metal surfaces with silicone rubber and flocking in similar fashion.

This laboratory uses calves and has found the same difficulty with anemia as that observed in Berlin. They also raise their own Beagle dogs.

They are critical of the Gott and Kusserow tests and feel that their own patch testing method in the left atrium and aortic wall in a simultaneous operation in either the calf or the dog is a far more telling test of the material to be surveyed.

They were equipped with items from the United States, including a Sarnes extracorporeal unit and a Belzer unit for renal preservation.

In spite of the fact that this is a very limited laboratory supported by a country the entire population of which is smaller than that of New York City, there were some very interesting accomplishments as follows:

1. A method of bringing conduits through the skin without ascent of infection. This involves a two stage procedure in which the device is implanted just beneath the skin and allowed to heal in position for three weeks before the conduit is passed through. This has worked very nicely.
2. Lung transplantation in the dog with immunosuppression. Transplants were shown which had been in place for eight months with removal of the opposite lung. This work was in the charge of a Dr. Kreuzer, who later presented it at the meetings in Barcelona.

3. The electronic circuitry for the intraaortic balloon was very impressive, and the simplicity of the clinical intraaortic balloon device surpassed anything that has been seen by the visitor.

4. The telemetric method for routine use in the intensive care unit was very impressive.

5. A very ingenious method has been developed by Dr. Thoma for provision of support after open heart operations characterized by failure of the left heart to assume the burden again. It had been proven to be effective in the experimental animal. Reprints, when available, were promised.